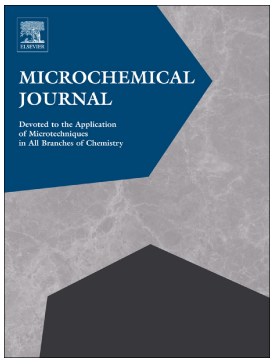

Electrochemical behavior of Diosmin and its sensitive determination on ZrO2-NPs-coated poly(diallyldimethylammonium chloride)-functionalized graphene modified electrode

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Electrochemical behavior of Diosmin and its sensitive determination on ZrO_2-NPs-coated poly(diallyldimethylammonium chloride)-functionalized graphene modified electrode

Huichao Li[a], Yongqin Liu[a], Lu Wang[a,b], Kai Sheng[a], Lina Zou[a,*], Baoxian Ye[a,*]

a College of Chemistry and Molecular Engineering, Zhengzhou University, Zhengzhou 450001, P R China.

b Department of Environmental Engineering and Chemistry, Luoyang Institute of Science and Technology, Luoyang 471023, PR China.

* Corresponding author. Tel.: +86 0371 67781757; fax: +86 0371 67763654.

*E-mal: yebx@zzu.edu.cn

Abstract

A new nanocomposite, zirconium dioxide nanoparticles decorated poly(diallyldimethylammonium chloride)-functionalized graphene (ZrO_2-PDDA-Gr), was successfully synthesized through a simple and green method. The simultaneous reduction of grapheme oxide (GO) and formation of ZrO_2 to produce the ZrO_2-PDDA-Gr had been achieved under hydrothermal conditions. The ZrO_2-PDDA-Gr showed excellent conductivity and strong adsorption ability toward Diosmin and thus was used to be an excellent probe for electrochemical sensing. The electrochemical characteristics of Diosmin were studied in detail and some dynamics parameters of electrode process were also calculated to discuss the reaction mechanism. Under the optimized conditions, a lower detection limit of 2×10^{-9} mol L^{-1} (S/N=3) and a wide linear detection range from 5×10^{-9} to 2×10^{-6} mol L^{-1} were achieved by differential pulse voltammetry (DPV). Additionally, the proposed electroanalytical methodology was applied in fresh lemon leaves and tablets with satisfactory results, showing that fabricated sensor has potential in application.

Keywords: Diosmin; Graphene; ZrO_2 NPs; Poly(diallyldimethylammonium chloride); Voltammetric sensor